

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1-24. (Canceled)

25. (New) A system for thermally mapping a vessel wall in the body of a patient, comprising:

an elongated member suitable for insertion in a vessel of a body of a patient, the elongated member having a proximal and a distal end;

an expansion device disposed at or about the distal end of the elongated member;

at least one thermal sensor capable of detecting relatively small temperature variations on the vessel wall, the at least one thermal sensor disposed on the expansion device wherein the expansion device is thereby capable of positioning the at least one thermal sensor against the vessel wall;

a control circuitry which receives and processes signals from the at least one thermal sensor; and

a display coupled to the control circuitry and arranged to receive information from the thermal sensor and to graphically display a thermal map showing temperature variations along a portion of the vessel wall.

26. (New) The system of claim 25 wherein the at least one thermal sensor comprises a plurality of thermal sensors arranged in a band disposed about the distal section of the elongate shaft.

27. (New) The system of claim 25 wherein the at least one thermal sensor is selected from the group consisting of an infrared sensor, a thermocouple and a thermistor.

28. (New) The system of claim 25 wherein the graphical display of the thermal map is color coded such that temperature of tissue graphically displayed is indicated by the color of the tissue on the display.

29. (New) The system of claim 25 further comprising an ultrasonic imaging arrangement disposed on or about the distal end of the elongated member and wherein the control circuitry receives and processes signals from the ultrasonic imaging arrangement and wherein the display is arranged to receive and merge the imaging signal with the thermal signal from the thermal sensor and to graphically display the merged signal.

30. (New) The system of claim 29 wherein the ultrasonic imaging arrangement comprises an ultrasonic transducer.

31. (New) The system of claim 30 wherein the ultrasonic imaging arrangement comprises a rotatable ultrasonic imaging transducer coupled to a rotatable shaft that extends proximally to the proximal end of the elongate flexible member.

32. (New) The system of claim 29 wherein the at least one thermal sensor and the ultrasonic imaging arrangement are disposed adjacent each other.

33. (New) The system of claim 25 further comprising at least a first flow altering member on the elongated member adjacent the at least one thermal sensor.

34. (New) The system of claim 33 further comprising at least a second flow altering member on the elongated member adjacent the at least one thermal sensor, the at least one thermal sensor being positioned on the elongated member between the first flow altering member and the second flow altering member.

35. (New) The system of claim 25 wherein the expansion device is a radially expansible balloon.

36. (New) A system for thermally mapping a vessel wall in the body of a patient, comprising:

an elongated member suitable for insertion in a vessel of a body of a patient, the elongated member having a proximal and a distal end;

an expansion device disposed at or about the distal end of the elongated member;

at least one thermal sensor capable of detecting relatively small temperature variations on the vessel wall, the at least one thermal sensor disposed on the expansion device wherein the expansion device is thereby capable of positioning the at least one thermal sensor against the vessel wall;

an ultrasonic imaging arrangement disposed on or about the distal end of the elongated member;

a control circuitry which receives and processes a thermal signal from the at least one thermal sensor and an imaging signal from the ultrasonic imaging arrangement; and

a display coupled to the control circuitry and arranged to receive and merge the imaging signal with the thermal signal from the thermal sensor and to graphically display a thermal map showing temperature variations along a portion of the vessel wall.

37. (New) The system of claim 36 wherein the at least one thermal sensor is selected from the group consisting of an infrared sensor, a thermocouple and a thermistor.

38. (New) The system of claim 36 wherein the at least one thermal sensor comprises a plurality of thermal sensors arranged in a band disposed about the distal section of the elongate shaft.

39. (New) The system of claim 36 wherein the ultrasonic imaging arrangement comprises an ultrasonic transducer.

40. (New) The system of claim 39 wherein the ultrasonic imaging arrangement comprises a rotatable ultrasonic imaging transducer coupled to a rotatable shaft that extends proximally to the proximal end of the elongate flexible member.

41. (New) The system of claim 36 wherein the at least one thermal sensor and the ultrasonic imaging arrangement are disposed adjacent each other.

42. (New) The system of claim 36 wherein the expansion device is a radially expansible balloon.

43. (New) A method of thermally mapping a vessel wall in the body of a patient, comprising:

inserting an elongated member having at least one thermal sensor disposed on or about the distal end of the elongated member into a vessel of a body of a patient;

altering the effect of blood flow in the region of the at least one thermal sensor;

receiving and processing signals from the at least one thermal sensor; and

receiving information from the thermal sensor and graphically displaying a thermal map showing temperature variations along a portion of the vessel wall.

44. (New) The method of claim 43 further comprising lowering blood flow in the region of the at least one thermal sensor.